Internal Threats and Mitigation Recommendations

Caves and Karst-The Earth in 3-D

Caves exist in a three dimensional world regardless of their genesis (e.g. solution/ volcanic/tectonic) most caves have a direct connection to surface processes.

Photo-Ronal C. Kerbo
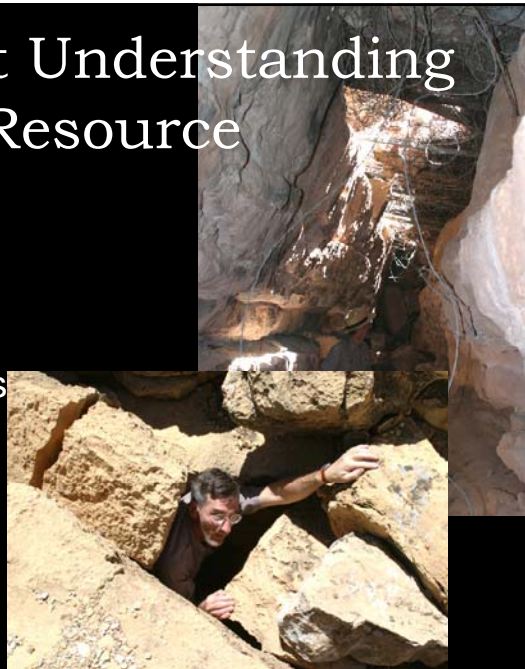
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Internal Threats

- Not Understanding the Resource
- Poor or No Planning
- Structures – Above and Near Caves
- Bad Practices

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Threat – Not Understanding the Resource

- Lack of knowledge
- No surveys
- Unaware of problems or potential problems
- Out of Sight – Out of Mind

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Mitigation

- Education
- Surveys & Inventories
- Research
- Planning Documents
- Guidelines

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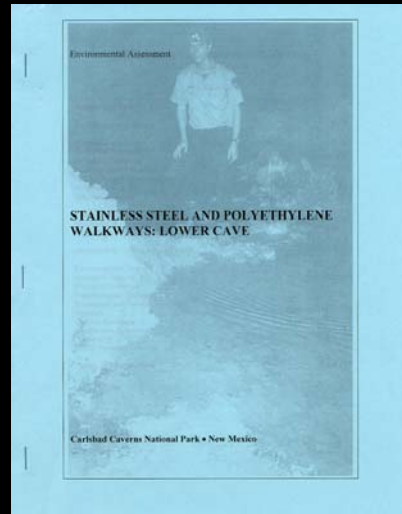
Threat – Poor or No Planning

- Development without Resource Considerations
- Uncontrolled Access

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Mitigation

- Planning Documents
- NEPA Compliance
- Public Involvement
- Education
- Resource Considerations

Threat - Structures

- Visitor Use Facilities
- Sewer Lines
- Living Quarters
- Parking Lots
- Maintenance Facilities
    - Buried Gas Tanks

Threat - Structures

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Mitigation

Structures Already in Place Over Caves
- Identify Most Significant Problems
- Remove if possible - Replace with state of the art technology if not possible
- Reroute sewer lines

New Structures
- Locate away from cave passages, if possible
- Double-walled sewer lines
- No buried gas tanks

Set Standards
- Determine and enforce environmentally friendly guidelines for living and working over cave areas

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Threat – Bad Practices

- Leaking/Overflowing Sewer Lines
- No Parking Lot Runoff Filter System
- Poor or No Planning
- Uncontrolled Access
- No Guidelines for Entering Caves
- Releasing Sensitive Information

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Mitigation

- Good Planning Documents
- State of the Art Technology
- Remove or Reroute When Possible
- Determine Levels of Access
- Develop Guidelines for Entering Caves
- Establish Sensitive Information Release Guidelines

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IN CONCLUSION

- Know the Resource
- Education
- Develop Planning Documents
- Remove or Mitigate Structure Impacts
- Develop Best Practices that Protect the Resources

Text by Dale Pate-NPS

Additional text by Ronal Kerbo

All photos-NPS (except as noted)

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